MODIS IOT Weekly Report
Mission Operations Days: 2000/295 to 2000/301
October 20, 2000 20:00:00 GMT to October 27, 2000 20:00:00 GMT

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Science Data Loss From SFE-A Anomaly (300/14:05:02-301/14:06:19)
See Anomaly section below for details.
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Terra Spacecraft and MODIS Instrument Status:

Terra (AM-1) is in Normal Mode
MODIS is in Science Mode

Blackbody		A On; B Off	Nominal
Calibration Electronics		A On; B Off	Nominal
Control Processor		A On; B Off	Nominal
Door: Nadir		Unlatched, open	Nominal
Space View		Unlatched, open	Nominal
Solar Diffuser		Unlatched, closed	Nominal
FDDI Formatter		A On; B off	Nominal
FIFO Memory		1 & 2 On; 3 & 4 Off	Nominal
Format Processor		A On; B off	Nominal
PC FPA		A On	Nominal
Power Supply:	1	On	Nominal
	2	Off	Nominal
PV FPAs:	VIS	A On	Nominal
	NIR	A On	Nominal
	SMIR	A On	Nominal
	LWIR	A On	Nominal
Radiative Cooler:			
Outgas Heaters		Off	Nominal
LWIR FPA Heater		On	Nominal
SMIR FPA Heater		Off	Nominal
Scan Assembly		A On; B off	Nominal
SDSM		Off	Nominal
SRCA		Off	Nominal
Survival Heaters:	PS1	Enabled	Nominal
	PS2	Enabled	Nominal
Timing Generator		A On; B Off	Nominal
Flight Software		Rev BD + 2 patches	Nominal
Inhibit Ids Set		54	Nominal
TMONs enabled		66, 67, 68	Nominal

This Week's Completed MODIS Activities:

Saturday, October 21, 2000
None

Sunday, October 22, 2000
None

Monday, October 23, 2000
None

Tuesday, October 24, 2000

298/22:05:22	Real-Time	Cleared Inhibit ID #54 (SRCA Commands) (Set by MODIS SRCA TMON #66 trip on DOY 290)
298/2206:11	Real-Time	Reset the SRCA Filter Wheel Step Count proc: MOD_SET_MTR_SW_COUNT(5,100)

The value of the SRCA Filter Wheel Step Count when the TMON #66 tripped was 100. The wheel was inhibited from being commanded (remaining at step 100), but the executing macro automatically sets the expected wheel position (Home, at step 20).

298/23:03:43	Real-Time	Returned SRCA Filter Wheel to Home (step 20) (Left at step 100 after the TMON #66 trip on DOY 290) proc: MOD_SRCA_HOME('N','RADIO')

Wednesday, October 25, 2000
None

Thursday, October 19, 2000
None

Friday, October 27, 2000

301/09:14:13	ATC OA15: SDSM Open
301/10:53:06	ATC OA16: SDSM Screened

The CAM for the MODIS Transition to B-Side Operations was approved (Friday, October 27, 2000). The transition is scheduled to begin at approximately 1300 GMT on Monday, October 30, 2000.

This Week's Scheduled MODIS Activities Not Completed:

298/21:15:43	Real-Time	Returned SRCA Filter Wheel to Home (step 20) proc: MOD_SRCA_HOME('Y','RADIO')

The parameters of this proc attempted to use a simple, software count method to return the SRCA motors to their home positions. The Filter Wheel's software count indicated it was currently at the Home position. Because of this, the SRCA Filter Wheel was not commanded to move. Before attempting this method again, the correct (non-Home) software step count of the Filter Wheel needed to be set.

298/22:07:54	Real-Time	Returned SRCA Filter Wheel to Home (step 20) proc: MOD_SRCA_HOME('Y','RADIO')

With the correct step count set, the Filter Wheel motor was commanded to move the necessary steps to return it to the home position (80 steps "backwards"). However, the Filter Wheel motor appears to have moved slightly slower than the software count was predicting. When the software count indicated that the Filter Wheel should be at the Home position, the wheel was still approximately 6 steps from Home (at step 26).

The MOD_SRCA_HOME proc was run for the 3rd time using the more robust method of moving the SRCA wheels (hence, the 'N' parameter). Instead of using software motor counts, this process instructs the SRCA Motors to continue turning until the Home triggers trip. At that point, the software step counts are updated to reflect the Home positions. This method is most useful when software counts have been lost/unknown, but also proved quite useful in this situation as well.

Upcoming MODIS Events:

Saturday, October 28, 2000
None

Sunday, October 29, 2000
None

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Monday, October 30, 2000
Either:
304/14:00:00 - 14:40:00 Real-time Begin Switch to B-side Science
304/14:57:54 - 15:09:52 X-band service to Goddard
Or:
304/15:21:18 - 15:59:58 Real-time Begin Switch to B-side Science
(Note: MOPITT has requested commanding during this pass)
304/16:35:01 – 16:48:47 X-band service to Goddard
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The Switch to B-Side Science will nominally involve:
- Turn off MODIS
- Turn on MODIS with Power Supply 2 and Control Processor B (red limits for 2 minutes)
- Disable TMON #68 commanding, FIFO double write

- Transition to Science Mode on the B-side (red limits for 2 minutes)
  (may see TAXI errors for 15 minutes)
- Enable TMON #68 commanding, FIFO double write
- Verify Correct CP status words
- Reset Formatter to Upload Mode
- Load Formatter Patch #1
- Load Formatter Patch #2
- Restart Formatter with ASTATE = 0

If B-Side Transition occurs successfully, then perform the following initial calibrations:

Tuesday, October 31, 2000		
305/19:?? - 20:??	Real-Time	Set SMIR Itwk/Vdet to 79/110
305/20:21:52	ATC	OA15: SDSM Open
305/22:00:45	ATC	OA16: SDSM Screened
305/23:00:00	ATC	Set Black Body Duty Cycle to 'FULL'
305/23:00:30	ATC	Set Black Body Temperature to '315K'
Wednesday, November 1, 2000		
306/06:00:00	ATC	Set Black Body Duty Cycle to 'THIRD'
306/06:00:30	ATC	Set Black Body Temperature to '270K'
Thursday, November 2, 2000		
307/04:00:30	ATC	Set Black Body Temperature to '290K'

Further calibration activities, gain changes, and Itwk/Vdet settings will be determined/proposed as the results of DOY 304 activities are finalized.

Maneuvers:

The next delta-v maneuver is scheduled for November 1st, 2000.

MODIS Anomalies:

On DOY 300 (Thursday, October 26, 2000), the AM-1 Terra SFE-A experience an error causing TMON16 to trip, thereby shutting off SFE-A. Until the SFE-A turned back on, no Science Data (for any instrument) will be collected (full science data loss). See the Non-MODIS Significant Events section below for a full description of the event.

TMON #66, the MODIS SRCA A-side lamp current/voltage monitor tripped on day 290 shortly after beginning the 30W lamp portion of the macro. The TMON set the lamp usage to OFF, turned off the SRCA, and set inhibit ID #51 (MODIS SRCA commands). Because of this, the SRCA Filter wheel was left at step 100 rather than the home position.

A transient high current to the lamps appears to be a normal characteristic of the lamps. At this time, investigation is continuing to determine a possible correction to the TMON algorithm or alternate SRCA operating philosophy.

[DOY 301 update] Recent analysis indicates that the initial transient current spikes associated with an On-Orbit 30W test will consistently exceed the time out sampling (two or more readings exceeding the specified limit) for triggering the SRCA TMONs. Additionally, the MODIS Team at SBRS is confident that the over current/voltage protection built into the SRCA will provide greater protection than the current SRCA TMONs are capable of providing. This translates into the protection of the TMONs as only being a semi-effective "fall-back". The conclusion is for TMONs #66 and #67 to be disabled via an Engineering Work Order prior to the next SRCA activities.

Continued monitoring for formatter errors and loss of cooler margin.

Attached to this report is a spreadsheet (FR_anomaly_log_102700.xls) listing the times, addresses, formatter temperature, satellite ground track, and space craft day/night position for a select number of the formatter events that have occurred since DOY 256. The current event count is 2576. Due to the high number of recent events, not all details have been updated in the anomaly log.

General Instrument Comments:

MODIS is in Science Mode on the A-side with the SVD and NAD open, operating with the Formatter Resolution Flight Software Patches.

The upcoming week will see the attempted switch to B-Side Operations for MODIS. A few of the major goals this switch will hope to produce:

- A more complete determination as to the cause of the sporadic A-Side Formatter Error Events.
- MCST's preferred Science Configuration for the upcoming "Golden Month" of November Science Data Collection.

MODIS Telemetry Trends:

The Radiative Cooler intermediate stage temperature has slowly been increasing since approximately day 240. During this time the LWIR focal plane heater margin has been decreasing. The IOT is continuing to trend these telemetry mnemonics.

Non-MODIS Significant Events:

The following message was distributed in regards to the SFE-A Anomaly:

"...the SFE-A shut off at 300/14:05:02. The anomaly investigation has been on going and the team has determined that the HPM2 card failed to send telemetry to the LPM. As a result TMON16 detected the HPM2BIT status as failed and sent the command to turn off SFE-A. No science data will be available until the SFE functionality is restored."

The anomaly resolution team concluded that the error was probably caused by a single event upset. The SFE-A was restarted, and science data collection appears to be proceeding nominally.

The duration that the SFE-A was disabled: 300/14:05:02 to 301/14:06:19 (Just over 24 hours)

NO Science Data will be available for this time period. All Science Data in this time frame has been permanently lost.

Limited Life Item Status:

SRCA 10W Lamp #1: 173.5 of 500 hours
SRCA 10W Lamp #2: 135.9 of 500 hours
SRCA 10W Lamp #3: 145.1 of 500 hours
SRCA 10W Lamp #4: 61.5 of 500 hours

SRCA 1W Lamp #1: 556.1 of 4000 hours
SRCA 1W Lamp #2: 276.3 of 4000 hours

Solar Diffuser Door: 1447 of 3022 Movements
Nadir Aperture Door: 532 of 1316 Movements
Space View Door: 437 of 1316 Movements